



US 20190291133A1

(19) **United States**(12) **Patent Application Publication****Leggett et al.**(10) **Pub. No.: US 2019/0291133 A1**(43) **Pub. Date: Sep. 26, 2019**(54) **METHOD FOR SMOOTHING SUBSTRATE SURFACE****B05D 3/06** (2006.01)**B32B 37/24** (2006.01)(71) Applicant: **Apple Inc.**, Cupertino, CA (US)(52) **U.S. Cl.****CPC** **B05D 5/00** (2013.01); **B32B 37/30** (2013.01); **B32B 43/00** (2013.01); **B32B 2038/0064** (2013.01); **B29C 73/02** (2013.01); **B05D 3/06** (2013.01); **B32B 37/24** (2013.01); **B05D 1/36** (2013.01)(72) Inventors: **William F. Leggett**, San Jose, CA (US); **Ming Kun Shi**, Morgan Hill, CA (US); **Christopher Bruni**, San Jose, CA (US); **Simon Regis Louis Lancaster-Larocque**, San Jose, CA (US)

(57)

ABSTRACT(21) Appl. No.: **16/440,883**(22) Filed: **Jun. 13, 2019****Related U.S. Application Data**

(63) Continuation of application No. 14/815,499, filed on Jul. 31, 2015, now Pat. No. 10,350,634.

Publication Classification(51) **Int. Cl.****B05D 5/00** (2006.01)**B32B 37/30** (2006.01)**B32B 43/00** (2006.01)**B05D 1/36** (2006.01)**B29C 73/02** (2006.01)

Methods for modifying contours of substrate surfaces are disclosed. Methods include depositing filler material on a critical mating surface of a substrate so as to render the mating surface more mateable with a matching substrate. The filler material can be deposited within or around features or defects on the mating surface such that a final desired surface contour is achieved. In some cases, the final surface contour of the mating surface is planar. This can prevent gaps associated with the features or defects from forming between the substrate and the matching substrate when they are joined together. The final surface contour of the mating surface can be determined by comparing dimensions of the mating surface to dimensions of a reference surface. In some cases, ink jet printing techniques are used to deposit the filler material accurately in prescribed locations and with precise thickness control.

